Complete Summary

GUIDELINE TITLE

Hand hygiene recommendations. In: Prevention and control of healthcare-associated infections in Massachusetts.

BIBLIOGRAPHIC SOURCE(S)

Hand hygiene recommendations. In: Betsy Lehman Center for Patient Safety and Medical Error Reduction, JSI Research and Training Institute, Inc. Prevention and control of healthcare-associated infections in Massachusetts. Part 1: final recommendations of the Expert Panel. Boston (MA): Massachusetts Department of Public Health; 2008 Jan 31. p. 36-41.

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Healthcare-associated infections, including:

- Catheter-associated urinary tract infection
- Surgical site infection
- Ventilator-associated pneumonia
- Bloodstream infection

GUIDELINE CATEGORY

Prevention

CLINICAL SPECIALTY

Family Practice
Infectious Diseases
Internal Medicine
Preventive Medicine
Surgery

INTENDED USERS

Advanced Practice Nurses
Hospitals
Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

- To provide evidence-based recommendations for a statewide infection control and prevention program to improve health outcomes by reducing the risk of acquiring and transmitting healthcare-associated infections (HAIs)
- To provide recommendations for hand hygiene

TARGET POPULATION

Patients at risk of healthcare-associated infections

INTERVENTIONS AND PRACTICES CONSIDERED

1. Handwashing and hand antisepsis using:
    - A non-antimicrobial and water
    - Antimicrobial soap and water
    - An alcohol-based hand rub

2. Selecting hand-hygiene products with low irritancy potential and soliciting input from healthcare workers (HCWs) regarding these products
3. Providing HCWs with skin care products
4. HCWs education and monitoring
5. Administrative measures

MAJOR OUTCOMES CONSIDERED

Incidence of healthcare-associated infections

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The Expert Panel was divided into six task groups. In order to generate sound, evidence-based recommendations, a comprehensive reference library was created for each task group comprising articles, publications, and other materials relevant to their work. An expert in library science, aided by a JSI Research and Training Institute, Inc. (JSI) staff member with experience in literature review, conducted literature searches, selected articles for inclusion, and managed and organized the task group libraries. For the purpose of the project, JSI gathered an extensive body of literature (over 2000 published articles). Starting with the reference library of a local healthcare associated infections (HAI) expert, it was supplemented and updated to include the most current articles and expanded on recommendations made by Expert Panel and task group members. Figure 1 in the original guideline document summarizes the literature review process.

Literature searches were conducted in PubMed using applicable Medical Subject Headings (MeSH) and key words. Refer to Figure 2 in the original guideline document for information on literature search methodology.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Level of Evidence Ranking

Level I: Strong evidence from at least one well-designed randomized controlled trial

Level II: Evidence from well-designed non-randomized trials; cohort or case-controlled analytic studies (preferably from >1 center); multiple time-series studies

Level III: Well-designed descriptive studies from more than one center or research group

Level IV: Opinions of authorities (e.g., guidelines), clinical evidence; reports of expert committees

Level V: No quality studies found and no clear guidance from expert committees, authorities or other sources

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

To aid the task groups and Expert Panel in their decisions, JSI Research and Training Institute, Inc. (JSI) generated qualitative summaries and reviews of relevant literature, outlining the current "state of the science" on task group-indicated topics of debate. All selected studies were critically assessed for internal validity or methodological rigor and only those with high quality of evidence grades were considered in generating evidence-based recommendations.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Consensus Development Conference)
Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The 2006 Health Care Reform Law directed the Massachusetts Department of Public Health (MDPH) to establish a comprehensive state wide infection prevention and control program. To direct this new effort, a healthcare-associated infection (HAI) Expert Panel was convened in November 2006 under the auspices of the Betsy Lehman Center for Patient Safety and Medical Error Reduction and MDPH. This multidisciplinary panel of experts included infectious disease specialists, epidemiologists, infection control and hospital quality professionals, consumers, professional organizations, and hospital executives and clinical leaders. Research, coordination and facilitation of the work of the Expert Panel and the associated Task Groups was provided by JSI Research and Training Institute, a public health research and consulting firm located in Boston.

The mission of the Expert Panel was to provide guidance on all aspects of a statewide infection control and prevention program, review the key elements of such a program, and submit their completed recommendations to the Betsy Lehman Center and the Massachusetts Department of Public Health by January 31, 2008.

The Expert Panel held twelve monthly meetings beginning on November 30, 2006. Due to the multi-faceted nature of the Panel's charge, six Task Groups were formed in order to focus the efforts of Panel members on their respective areas of expertise.

1. Bloodstream and Surgical Site Infections (BSI, SSI)--Prevention, Surveillance, and Reporting
2. Optimal Infection Control Program Components
3. Ventilator-Associated Pneumonia (VAP)--Prevention, Surveillance, and Reporting
4. Methicillin-Resistant *Staphylococcus aureus* (MRSA) and Other Selected Pathogens--Prevention, Surveillance, and Reporting

5. Public Reporting and Communication
6. Pediatric Affinity Group--Prevention, Surveillance, and Reporting

Panel members were asked to join at least one group, aligning with their expertise and interest. Additionally, group membership was supplemented with experts and stakeholders from outside the Expert Panel. Each task group was led by an Expert Panel member (Task Group Leader) who facilitated the calls and assisted in the literature review process. Task groups held one-hour-long conference calls every three weeks. A JSI coordinator supported each task group by reviewing and summarizing the literature and aiding in drafting recommendations. Coordinators were also responsible for all administrative work including minute taking, distribution of materials, and communication between the Expert Panel and task groups.

Due to time and capacity limitations, catheter-associated urinary tract infections (CAUTI) were not a specific task group topic. However, the product of a parallel process of evidence review and guideline updating, by experts representing the Infectious Disease Society of America (IDSA) and the Society for Healthcare Epidemiology of America (SHEA), was graciously made available to our project. An ad hoc committee of Expert Panel members and outside experts studied and endorsed these prevention guidelines and they have been incorporated into this final report.

Expert Panel recommendations, in addition to being scientifically sound, needed to take into account the current practices of infection control programs in Massachusetts. For this purpose, JSI surveyed infection control program directors across the Commonwealth in the areas of prevention, surveillance, reporting, and education relating to HAIs. The comprehensive survey questionnaire was developed using a review of current literature, expert reports, and existing surveys. After receiving input and approval from the Expert Panel and the Harvard Pilgrim Health Care Institutional Review Board, the survey was piloted in six hospitals. Once final revisions were made, the survey was mailed to the infection control program of all 71 acute care (non-Veterans Administration) hospitals in Massachusetts. A follow-up phone interview was also conducted to solicit more qualitative information and clarify any answers on the written survey. The completed survey responses were analyzed and results were distributed to project members to aid in their decision-making.

Taking into consideration both the results of the survey and the evidence, task groups drafted recommendations in the areas of HAI prevention and reporting. When voting, either during meetings or electronically, task group members had the opportunity to make comments and suggest additional changes. JSI then tallied the task group votes, reviewed comments, and brought back any major points of contention to the task group.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Strength of Recommendation Ranking

Category A: Strongly recommended

Category B: Recommended for implementation

Category C: Consider for implementation

Category D: Recommended against implementation

Category UI: Unresolved issue

No recommendation: Unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.

COST ANALYSIS

The annual economic burden of healthcare-associated infections (HAI) in Massachusetts ranges from approximately $200 million to well over $400 million. While it is difficult to determine a precise estimate, it is clear that these infections are costly. Mandatory reporting of institutional-level HAI is a potential tool for improvement of quality of care and a method to be used by consumers, insurers, or providers to make decisions regarding where to seek or fund healthcare. If HAI are reduced with mandatory reporting, societal cost-savings should be anticipated. However, the effect of mandatory reporting on HAI rates is yet unknown. Additionally, increased costs to the hospitals and the Department of Public Health (DPH) should be anticipated. The methods used in this report should be beneficial to other state DPH. With limited resources and the potential benefits of public reporting yet to be established, there is a need to carefully balance the additional burden of reporting with current prevention efforts in order to obtain the optimum outcome, less infections.

Refer to *Prevention and Control of Healthcare-Associated Infections in Massachusetts, Part 2: Findings from Complementary Research Activities* (see the "Availability of Companion Documents" field) for more information on cost-analysis.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Once recommendations were approved by the task group members, they were presented to the Expert Panel for consideration and any necessary final revisions.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from the Massachusetts Department of Public Health (MDPH) and the National Guideline Clearinghouse (NGC): *Prevention and Control of Healthcare-Associated Infections in Massachusetts* guideline has been divided into individual summaries. In addition to the current summary, the following are available:

- Standard precautions in hospitals
- Contact precautions in hospitals
- Environmental measures for the prevention and management of multi-drug resistant organisms
- Prevention of ventilator-associated pneumonia
- Prevention of surgical site infections
- Prevention of bloodstream infections
- Prevention of catheter-associated urinary tract infections

Level of evidence ranking (I – V) and strength of recommendation ranking (A – D, Unresolved issue [UI], No recommendation) definitions are presented at the end of "Major Recommendations" field.

Hand Hygiene Recommendations

1. Indications for handwashing and hand antisepsis
    A. When hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, wash hands with either a non-antimicrobial soap and water or an antimicrobial soap and water. ***A-IV****
    B. If hands are not visibly soiled, an alcohol-based hand rub is preferred for routinely decontaminating hands in all other clinical situations described in items below because it significantly reduces the number of microorganisms on the skin and is easy to use. ***A-I*** (Girou et al., 2002; Lucet et al., 2002; Parienti et al., 2002; Kac et al., 2005; Larson et al., 2005; Sickbert-Bennett et al., 2005; Macdonald et al., 2006). Alternatively, wash hands with an antimicrobial soap and water in all clinical situations described in items below (C-J) ***A-II****
    C. Decontaminate hands before having direct contact with patients. ***A-II****
    D. Decontaminate hands before donning sterile gloves when inserting a central intravascular catheter. ***A-II****
    E. Decontaminate hands before inserting indwelling urinary catheters, peripheral vascular catheters, or other invasive devices that do not require a surgical procedure. It is unknown whether more intensive hand hygiene is required for prolonged non-surgical procedures and therefore current Centers for Disease Control and Prevention (CDC) hand hygiene guidelines should be followed in the interim. ***A-II*** (Chambers et al., 2006).
    F. Decontaminate hands after contact with a patient's intact skin (e.g., when taking a pulse or blood pressure, and lifting a patient). ***A-II****
    G. Decontaminate hands after contact with body fluids or excretions, mucous membranes, non-intact skin, and wound dressings if hands are not visibly soiled. ***A-II****
    H. Decontaminate hands if moving from a contaminated-body site to a clean-body site during patient care. ***A-III****
    I. Decontaminate hands after contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient. ***A-III****
    J. Decontaminate hands after removing gloves. ***A-II****
    K. Before eating and after using a restroom, wash hands with a non-antimicrobial soap and water or with an antimicrobial soap and water. ***A-II****

L. Antimicrobial-impregnated wipes (i.e., towelettes) may be considered as an alternative to washing hands with non-antimicrobial soap and water. Because they are not as effective as alcohol-based hand rubs or washing hands with an antimicrobial soap and water for reducing bacterial counts on the hands of healthcare workers (HCWs), they are not a substitute for using an alcohol-based hand rub or antimicrobial soap. ***B-II****

M. Based on in vitro data, alcohol is not effective at killing spores of organisms such as *Clostridium difficile* or *Bacillus anthracis*. (III) Although no direct comparison studies have been conducted, washing hands with water and soap physically removes spores from the skin and therefore may be more effective in this clinical setting. (IV) ***B-V*** (Bettin et al., 1994; King, 2004; Gordin et al., 2005; Boyce et al., 2006; Cherifi et al., 2006). In the setting of an outbreak of a spore-forming organism such as *Clostridium difficile*, washing hands with soap and water is recommended. ***B-IV*** (Bettin et al., 1994; King, 2004; Gordin et al., 2005; Boyce et al., 2006; Cherifi et al., 2006).

N. No recommendation can be made regarding the routine use of nonalcohol-based hand rubs for hand hygiene in health-care settings. Unresolved issue. ***B-IV****

For surgical antisepsis recommendations, please refer to *Hand/forearm antisepsis for surgical team members* in the NGC summary of the Massachusetts Department of Public Health guideline Prevention of Surgical Site Infections (SSI).

Hand-Hygiene Technique

2. When decontaminating hands with an alcohol-based hand rub, apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers, until hands are dry. Follow the manufacturer's recommendations regarding the volume of product to use. ***A-II****
3. When washing hands with soap and water, wet hands first with water, apply an amount of product recommended by the manufacturer to hands, and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly with a disposable towel. Use towel to turn off the faucet. ***A-II**** Avoid using hot water, because repeated exposure to hot water may increase the risk of dermatitis. ***A-II****
4. Liquid, bar, leaflet or powdered forms of plain soap are acceptable when washing hands with a non-antimicrobial soap and water. When bar soap is used, soap racks that facilitate drainage and small bars of soap should be used. ***B-III****
5. Multiple-use cloth towels of the hanging or roll type are not recommended for use in health-care settings. ***A-IV****
6. Standard hand hygiene practices apply to neonatal intensive care units (ICUs); surgical scrubs are not routinely required. ***A-III*** (Sharek et al., 2002; Won et al., 2004)

Selection of Hand-Hygiene Agents

7. Provide personnel with efficacious hand-hygiene products that have low irritancy potential, particularly when these products are used multiple times per shift. This recommendation applies to products used for hand antisepsis before and after patient care in clinical areas and to products used for surgical hand antisepsis by surgical personnel. If hands are not visibly soiled, alcohol-based hand rubs (ABHRs) are preferred because ABHRs have a lower irritancy potential for skin. ***B-II*** (Kramer, Bernig, & Kampf, 2002; Pedersen et al., 2005; Houben, De Paepe, & Rogiers, 2006; Kampf, Wigger-Alberti, & Wilhelm, 2006).
8. To maximize acceptance of hand-hygiene products by healthcare workers, solicit input from these employees regarding the feel, fragrance, and skin tolerance of any products under consideration. The cost of hand-hygiene products should not be the primary factor influencing product selection. ***B-II****
9. When selecting non-antimicrobial soaps, antimicrobial soaps, or alcohol-based hand rubs, solicit information from manufacturers regarding any known interactions between products used to clean hands, skin care products, and the types of gloves used in the institution. ***B-IV****
10. Before making purchasing decisions, evaluate the dispenser systems of various product manufacturers or distributors to ensure that dispensers function adequately and deliver an appropriate volume of product. ***B-III****
11. Do not add soap to a partially empty soap dispenser. This practice of "topping off" dispensers can lead to bacterial contamination of soap. ***A-II****

Skin Care

12. Provide HCWs with hand lotions or creams to minimize the occurrence of irritant contact dermatitis associated with hand antisepsis or handwashing. ***A-I****
13. Solicit information from manufacturers regarding any effects that hand lotions, creams, or alcohol-based hand antiseptics may have on the persistent effects of antimicrobial soaps being used in the institution. ***B-III****

Other Aspects of Hand Hygiene

14. Do not wear artificial fingernails or extenders when having direct contact with patients at high risk (e.g., those in intensive-care units or operating rooms). ***A-II****

    Do not wear artificial nails in environments that require sterile conditions (e.g., pharmacies or sterile processing departments). ***A-IV****

15. Keep natural nail tips less than 1/4-inch long. ***A-IV****
16. Wear gloves when contact with blood or other potentially infectious materials, mucous membranes, and non-intact skin could occur. ***A-IV****
17. Remove gloves after caring for a patient. Do not wear the same pair of gloves for the care of more than one patient, and do not wash gloves between uses with different patients. ***A-II****
18. Change gloves during patient care if moving from a contaminated body site to a clean body site. ***A-IV****
19. No recommendation can be made regarding wearing rings in non-surgical healthcare settings. ***B-V****

Healthcare Worker Educational and Motivational Programs

20. As part of an overall program to improve hand hygiene practices of HCWs, educate personnel regarding the types of patient-care activities that can result in hand contamination and the advantages and disadvantages of various methods used to clean their hands. ***A-III****
21. Monitor HCWs' adherence with recommended hand hygiene practices with an accepted monitoring approach (refer to section 9 for details) and provide personnel with information regarding their performance. ***A-II*** (Berhe et al., 2006; Eckmanns et al., 2006, "Compliance with antiseptic"; Eckmanns et al., 2006, "Hand rub consumption"; Eldridge et al., 2006; Golan et al., 2006; Jenner et al., 2006; McArdle et al., 2006; McGuckin et al., 2006; Randle, Clarke, & Storr, 2006; van de Mortel & Murgo, 2006; Shadowen et al., 2006). Additionally, when outbreaks of infection occur or unusual pathogens are detected, assess the adequacy of healthcare worker hand hygiene and compliance with fingernail recommendations. ***A-IV*** (Berhe et al., 2006; Eckmanns et al., 2006, "Compliance with antiseptic"; Eckmanns et al., 2006, "Hand rub consumption"; Eldridge et al., 2006; Golan et al., 2006; Jenner et al., 2006; McArdle et al., 2006; McGuckin et al., 2006; Randle, Clarke, & Storr, 2006; Van de Mortel & Murgo, 2006; Shadowen et al., 2006).
22. Encourage patients and their families to remind HCWs to decontaminate their hands in addition to other efforts to improve compliance with hand hygiene. ***B-II*** (McGuckin et al., 2004; McGuckin, 2001; Naikoba & Hayward, 2001).

Administrative Measures

23. Make improved hand hygiene adherence an institutional priority and provide appropriate administrative support and financial resources. ***A-II****
24. Implement a multidisciplinary program designed to improve adherence of health personnel to recommended hand-hygiene practices. ***A-II****
25. As part of a multidisciplinary program to improve hand hygiene adherence, provide HCWs with a readily accessible alcohol-based hand-rub product. ***A-II****
26. To improve hand-hygiene adherence among personnel who work in areas in which high workloads and high intensity of patient care are anticipated, make an alcohol-based hand rub available at the entrance to the patient's room or at the bedside, in other convenient locations, or in individual pocket-sized containers to be carried by HCWs. ***A-II****
27. Store supplies of alcohol-based hand rubs in cabinets or areas approved for flammable materials. ***A-IV****

Performance Indicators

Monitoring for adherence to hand hygiene should be done using an accepted approach and that same approach should be used consistently within a single institution. Some approved approaches include performance indicator A or B listed below. ***A-IV****

A. Periodically monitor and record adherence as the number of hand-hygiene episodes performed by personnel/number of hand-hygiene opportunities by ward or by service. Provide feedback to personnel regarding their performance. ***B-IV****

B. Monitor the volume of alcohol-based hand rub (or detergent used for handwashing or hand antisepsis) used per 1,000 patient-days. ***B-IV****

*Identifies evidence from the CDC's updated guidelines without repeating the detailed literature review process.

Definitions:

Level of Evidence Ranking

Level I: Strong evidence from at least one well-designed randomized controlled trial

Level II: Evidence from well-designed non-randomized trials; cohort or case-controlled analytic studies (preferably from >1 center); multiple time-series studies

Level III: Well-designed descriptive studies from more than one center or research group

Level IV: Opinions of authorities (e.g., guidelines), clinical evidence; reports of expert committees

Level V: No quality studies found and no clear guidance from expert committees, authorities or other sources

Strength of Recommendation Ranking

Category A: Strongly recommended

Category B: Recommended for implementation

Category C: Consider for implementation

Category D: Recommended against implementation

Category UI: Unresolved issue

No recommendation: Unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Evidence-based best practice guidelines and interventions for prevention of healthcare-associated infection will promote patient and healthcare worker safety and improve health outcomes by reducing the risk of acquiring and transmitting healthcare associated infections.

POTENTIAL HARMS

Hand antisepsis or handwashing can cause contact dermatitis

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The final recommendations contained in *Prevention and Control of Healthcare-Associated Infections in Massachusetts* were adopted by the Betsy Lehman Center for Patient Safety and Medical Error Reduction (BLC) and the Massachusetts Department of Public Health (MDPH). MDPH incorporated the recommendations into the reporting requirements, and developed an assessment tool for surveyors to use to evaluate the implementation of best practices.

IMPLEMENTATION TOOLS

Staff Training/Competency Material

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Hand hygiene recommendations. In: Betsy Lehman Center for Patient Safety and Medical Error Reduction, JSI Research and Training Institute, Inc. Prevention and control of healthcare-associated infections in Massachusetts. Part 1: final recommendations of the Expert Panel. Boston (MA): Massachusetts Department of Public Health; 2008 Jan 31. p. 36-41.

ADAPTATION

The guideline was adapted from: Healthcare Infection Control Practices Advisory Committee, Hospital Infection Control Practices Advisory Committee/Society for Healthcare Epidemiology of America/Association for Practitioners in Infection Control/Infectious Diseases Society of America (HICPAC/SHEA/APIC/IDSA) Hand Hygiene Task Force. Guideline for hand hygiene in health-care settings. Morbidity and Mortality Weekly Report (MMWR) Recomm Rep 2002 Oct 25;51(RR-16):1-48.

DATE RELEASED

2008 Jan 31

GUIDELINE DEVELOPER(S)

Betsy Lehman Center for Patient Safety and Medical Error Reduction - State/Local Government Agency [U.S.]
Massachusetts Department of Public Health - State/Local Government Agency [U.S.]

SOURCE(S) OF FUNDING

Massachusetts Department of Public Health

GUIDELINE COMMITTEE

Massachusetts Healthcare-Associated Infections Expert Panel

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Richard T. Ellison III, MD (*Chair*) Hospital Epidemiologist, Professor of Medicine, Molecular Genetics and Microbiology, University of Massachusetts Memorial Medical Center; Mary Ellen Scales, RN, MSN, CIC (*Vice-Chair*) Manager, Infection Control, Baystate Medical Center; Mary Alexander, RN, Chief Executive Officer, Infusion Nurse's Society; Eric Alper, MD, Internal Medicine, University of Massachusetts Memorial Medical Center; Evie Bain, RN, Occupational Health & Safety, Massachusetts Nurses Association; Anne Baras, RN, Surgical Technology Department Chair, North Shore Community College; Karen Boudreau, MD, Medical Director, Healthcare Quality Improvement, Blue Cross Blue Shield of MA; Ann Marie Bourque, NP, President, New England Chapter of the

National Conference of Gerontological Nurse Practitioners; Lou Ann Bruno-Murtha, MD, Medical Director, Infection Control Division Chief, Cambridge Health Alliance; Wanda Carey, RN, BSN, CIC, Manager, Infection Control, Caritas Norwood Hospital; Philip Carling, MD, Director, Infectious Diseases and Hospital Epidemiology, Caritas Carney Hospital; Donald Craven, MD, Chair, Infectious Disease, Lahey Clinic; Jane Foley, RN, Director of Operations, Nursing, Beth Israel-Deaconess Medical Center; Denise Graham, Sr. Director Public Policy, Association for Professionals in Infection Control and Epidemiology; Paula Griswold, MS, Executive Director, Massachusetts Coalition for the Prevention of Medical Errors; David Hooper, MD, Internal Medicine/ID, Massachusetts General Hospital; Linda Kenney, President, Executive Director, Medically Induced Trauma Support Services; Jim Liljestrand, MD, Medical Director, Quality Improvement, MassPro; Michael Mitchell, MD, Director, Microbiology Services, University of Massachusetts Memorial Medical Center; Sharon-Lise Normand, PhD, Professor of Biostatistics, Harvard Medical School; Richard Olans, MD, Director, Infectious Disease, Hallmark Health Hospitals; Gail Potter-Bynoe, BS, CIC, Manager, Infection Control, Children's Hospital Boston; Selwyn Rogers, MD, Division Chief, Trauma, Burns, and Surgical Critical Care, Director, Center for Surgery and Public Health, Assistant Professor of Surgery, Brigham and Women's Hospital; Jeannie Sanborn, RN, MS, CIC, Infection Control Professional Heywood Hospital; Thomas Sandora, MD, Pediatric ID, Children's Hospital Boston; Kenneth Sands, MD, Senior Vice President, Health Care Quality, Beth Israel-Deaconess Medical Center; Christine Schuster, RN, CEO and President, Emerson Hospital; David Smith, MHSA, Senior Director, Health Data Analysis & Research, Massachusetts Hospital Association; Carol Sulis, MD, Hospital Epidemiologist, Associate Professor of Medicine, Boston Medical Center; Thomas Sullivan, MD, Cardiologist in Private Practice, Women's Health Center Cardiology (Danvers)

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Massachusetts Department of Public Health Web site.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Betsy Lehman Center for Patient Safety and Medical Error Reduction, JSI Research and Training Institute, Inc. Prevention and control of healthcare-associated infections in Massachusetts. Part 2: findings from complementary research activities. Boston (MA): Massachusetts Department of Public Health; 2008 Jan 31. 131 p. Available in Portable Document Format (PDF) from the Massachusetts Department of Public Health Web site.

- Handwashing education materials for health care professionals. Available from the Massachusetts Department of Public Health Web site.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on October 22, 2008. The information was verified by the guideline developer on December 22, 2009.

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